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3579

Attorney Docket No. 834/39803
PATENT

AF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Walter Viegener	Confirmation No.	4534
Serial No.:	09/200,179	Art Unit:	3679
Filed:	November 25, 1998	Examiner:	Aaron M. Dunwoody

For: NON-DETACHABLE PRESS FIT ARRANGEMENT BETWEEN A FITTING AND AN END PORTION OF A METAL PIPE

SUBMISSION OF APPLICANT'S BRIEF
UNDER 37 C.F.R. 1.192

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Enclosed is Applicant's Brief in triplicate with a check for the required fee of $330.00.

It is respectfully requested that any shortage in the fee, be charged, or any overpayment in fees be credited, to the Account of Barnes & Thornburg, Deposit Account No. 02-1010 (834/39803).

Respectfully submitted,

BARNES & THORNBURG

Richard B. Lazarus
Reg. No. 48,215
Tel. No. (202) 289-1313

Enclosure
77152v2 DCDS01

Attorney Docket No. 834/39803
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Walter Viegener	Confirmation No.	4534
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For: NON-DETACHABLE PRESS FIT ARRANGEMENT BETWEEN A FITTING AND AN END PORTION OF A METAL PIPE

APPEAL BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Below is an Appeal Brief in support of an appeal taken from the Final Rejection of November 17, 2003 rejecting Claims 1, 2, 6, 9, 11 and 18-25. A Notice of Appeal was filed on February 12, 2004.

1. **Real party in interest.** All rights in this application have been assigned to Franz Viegener II GMBH & Co. KG, a corporation organized under the laws of Germany and having a place of business at Ennester Weg 9, 57439 Attendorn, Germany.

2. **Related appeals and interferences.** Appellant, undersigned counsel for appellant, and assignee know of no appeals or interferences related to the present application on appeal.

3. **Status of Claims.** The application contains Claims 1-6, 9, 11 and 13-25. Claims 3-5 and 13-17 are withdrawn from consideration. Claims 1, 2, 6, 9, 11 and 18-25 stand rejected.

Claims 1, 2, 6, 9, 11 and 20-24 have been rejected under 35 U.S.C. 102(e) as being anticipated by Grenier (U.S. Patent No. 5,695,224).

Claims 1, 2, 6, 9, 11 and 20-24 have been rejected under 35 U.S.C. 102(e) as being anticipated by Washburn (U.S. Patent No. 5,722,702).

Claims 1, 2, 6, 9, 11 and 18-21, 23 and 24 have been rejected under 35 U.S.C. 102(b) as being anticipated by Crickmer (U.S. Patent No. 2,225,208).

Claims 18, 19 and 25 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Grenier.

Claims 18, 19 and 25 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Washburn.

Claim 25 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Crickmer.

4. **Status of Amendments.** All amendments filed by appellant have been entered and considered by the examiner. On November 17, 2003, a final rejection of the above-noted pending claims was issued. Appellant has not filed an After Final Amendment. Appellant's Notice of Appeal was filed on February 12, 2004.

5. **Summary of the Invention.** The invention is directed to a non-detachable cold formed press fit arrangement between an end portion of a metal pipe and a socket. The socket 3 has an annular interior anchoring groove for receiving a sealing ring and is further provided with a receiving groove 11 for securement of a holding element 10. In the exemplified embodiment of FIG. 1, the holding element 10 is ring-shaped and slotted in longitudinal direction to form a plurality of projections 12 which are spaced about the circumference of the holding element 10 and point in the direction of the pipe end 4.

In FIG. 1 there is shown an end portion 4 of a metal pipe, fitting 1 including a spigot 2, which is provided with an external thread for attachment e.g. to another pipe (not shown), and a socket 3 for receiving the pipe end 4. The socket 3 has an inside diameter which corresponds to the outside diameter of the pipe end 4 and is formed interiorly with a circumferential annular stop surface 5 for interaction with an end face 6 of the pipe end 4 to thereby restrict the entry path of the pipe end 4.

After inserting the pipe end 4 through the entry opening of the socket 3 until the end face 6 of the socket 3 impacts the stop surface 5, a press tool 13 (FIG. 2) is attached from

outside to the socket 3 for subsequent execution of the crimping operation. The socket 3 of the fitting 1 is formed about its outer peripheral surface with a circumferential groove 21 for receiving a complementary rib 13' of the press tool 13.

As shown in particular in FIG. 4, the projections 12 of the holding element 10 are pointed toward the outer surface area of the pipe end 4. After radial crimping operation, liquid flowing through the metal pipe 4 is kept away from the holding element 10 as a result of the interference fit of the sealing ring 9 upon the pipe end 4 whereas the projections 12 of the holding element 10 dig into the material of the pipe end 4, as shown in FIG. 3 and in particular in FIG. 5. Thus, the socket 3 of the fitting 1 is cold formed with the holding element and is positively attached to the pipe end 4. After removing the press tool 13, a slight recoil of the cold formed fitting parts is encountered. However, during the slight recoil, the projections 12 of the holding element 10 remain entrenched in the material of the pipe end 4. The final state of the crimping operation is shown in FIG. 6.

FIGS. 7 to 18 show further variations.

6. **Issues on appeal.**

Whether Claims 1, 2, 6, 9, 11 and 20-24 are anticipated under 35 U.S.C. 102(e) by Grenier (U.S. Patent No. 5,695,224).

Whether Claims 1, 2, 6, 9, 11 and 20-24 are anticipated under 35 U.S.C. 102(e) by Washburn (U.S. Patent No. 5,722,702).

Whether Claims 1, 2, 6, 9, 11 and 18-21, 23 and 24 are anticipated under 35 U.S.C. 102(b) by Crickmer (U.S. Patent No. 2,225,208).

Whether Claims 18, 19 and 25 are unpatentaable under 35 U.S.C. 103(a) over Grenier.

Whether Claims 18, 19 and 25 are unpatentaable under 35 U.S.C. 103(a) as being unpatentable over Washburn.

Whether Claim 25 are unpatentaable under 35 U.S.C. 103(a) over Crickmer.

7. **Grouping of Claims.** Claims 2, 6, 11 and 18-24 stand or fall with claim 1. Claims 9 and 25 stand or fall individually.

8. **Copy of the Claims.** A copy of the Claims on appeal is attached to this Brief as Appendix A.

9. **Argument.**

The claimed invention is directed to a non-detachable press fit arrangement between an end portion of a metal pipe and a crimpable socket of a fitting... said press fit arrangement comprising at least one holding element resiliently secured to the socket in a receiving groove and cold formed together with the socket....

The Prior Art

Grenier discloses a coupling assembly 8 with pipe 100 inserted so that it is snugly received inside tubular receiving member 10. Pipe 100 contacts stop shoulder 24 and compresses member 34 as shown in FIG. 6A to accomplish a fluid-tight seal. Inner rim portion 33 has projecting circumferential knife edge 70 that penetrates the outer surface of pipe 100 as shown in enlarged detail in FIG. 6B. This penetration prevents pipe 100 from being withdrawn from coupling assembly 8. Grenier does not disclose a cold formed socket, metal pipe and holding element as recited in appellant's claims on appeal.

Washburn discloses a compression coupler for joining pipes made of plastic or other similar materials. The compression coupler 10 is installed by inserting the end of a plastic pipe 12 into one of the end portions 26, through the forming ring 20, through the locking ring 16, through the sealing ring 18, and into the center portion 24 of the sleeve 14 until the end engages the abutment 34 in the center portion 24 of the sleeve 14. The plastic pipe 12 is locked into position by tightening the compression device 22, i.e., by turning the locking screw 58 with a nut driver. As the compression device 22 is tightened, the elements 40 of the end portion 26 of the sleeve 14 are deflected radially inwardly toward the plastic pipe 12 and the tangs 52 of the locking ring 16 are forced into locking engagement with and dig into the exterior surface of the plastic pipe 12. The compression coupler 10 can be removed by reversing the above-described installation procedure. Washburn does not disclose a cold formed socket, metal pipe and holding element as recited in appellant's claims on appeal.

Crickmer discloses connecting pipes 10 and 11 via a coupling 12. Coupling 12 includes cylindrical housing 13 which is fastened around pipes 10 and 11 by bolts 15 and 16. Gripping members 21 are provided such that when the housing 13 is tightened around the gripping members 21 flange 26 of each gripping member is forced inwardly to engage or bite into the external surface of its respective pipe (see page 2, left column, lines 64-70). Crickmer does not disclose a cold formed socket, metal pipe and holding element as recited in appellant's claims on appeal.

Claim 1

Claim 1 is directed to a non-detachable press fit arrangement between an end portion of a metal pipe and a crimpable socket of a fitting... said press fit arrangement comprising at least one holding element resiliently secured to the socket in a receiving groove and cold formed together with the socket....

The final office action rejects claim 1 as anticipated by Grenier, Washburn or Crickmer. As noted above with respect to the description of each of the prior art, none of Grenier, Washburn or Crickmer disclose a cold formed socket and holding element as recited in appellant's claim 1.

At page 2 of the final office action Grenier is described by stating that "the press fit arrangement comprising at least one holding element (30,32) resiliently secured to the socket in a receiving groove (13) and cold formed together with the socket...." This conflicts with the statement in Grenier that

> Annular locking member 30 is stamped from a spring temper metal material such as 0.015" thick stainless steel. Member 30 has sufficient spring temper so that it's inner rim portion 33 can move from its relaxed position shown in FIG. 4C to the fully extended or straightened position shown in FIG. 7, and return without deformation to its rest position when the pipe is removed from the coupling. (Column 4, lines 3-10).

If the locking member 30 in Grenier were cold formed it could not "return without deformation to its rest position when the pipe is removed from the coupling."

The statement at page 4 of the final office action that "the socket is crimped by cold forming" is also incorrect. There is nothing in Grenier to support the conclusion that the socket is cold formed. In Grenier

> [f]luid pressure within tubular member 100 exerts a longitudinally directed force on member 100 to cause member 100 to move outboard toward opening 12 as shown in FIG. 7. This action causes inner rim portion 33 of locking member 30 to straighten towards axis A of outer portion 31, which causes knife edge 70 to dig further into the outer surface of pipe 100 to more firmly hold pipe 100 within coupling assembly 8. Thus, as the pressure in pipe 100 increases, pipe 100 is held even more firmly within coupling assembly 8. (Column 4, lines 39-47).

In Grenier the pipe is held in the socket by a combination of fluid pressure in the pipe 100 and the locking member 30. Disassembly of the pipe 100 from the coupling assembly 8 is

described in Grenier at column 4, line 7+ wherein it is evident that the socket is not crimped by cold forming. For the above reasons, it is evident that there is no cold forming in Grenier and Grenier does not anticipate this feature of appellant's claim 1.

At page 3 of the final office action it is stated that

> a comparison of the recited process with the prior art processes does NOT serve to resolve the issue concerning patentability of the product... [w]hether a product is patentable depends on whether it is known in the art or it is obvious, and is not governed by whether the process by which it is made is patentable... product-by-process claims are not constured as being limited to the product formed by the specific process recited... [t]herefore, the ends penetrate the metal pipe after the socket is crimped by cold forming is given little patentable weight.

The recitation in claim 1, on appeal, of "a non-detachable press fit arrangement between an end portion of a metal pipe and a crimpable socket of a fitting... said press fit arrangement comprising at least one holding element resiliently secured to the socket in a receiving groove and cold formed together with the socket...." describes structure. Specifically, "cold formed" is a term of art which describes the altered properties of the meterial.[1]

The statement in the final office action that "cold forming is given little patentable weight" contends, in effect, that this limitation is irrelevant. This is clearly wrong, because all the limitations in a claim must be considered. Assertion that functional language of claims may be disregarded because it simply describes inherent functions of claimed structural elements, violates "all elements" rule of claim construction.[2]

The governing law is stated in Ethyl Molded Products Co. v. Betts Package Inc., 9 USPQ2d 1001, 1030 (DC EKy 1988).

> It is well settled that there is nothing intrinsically wrong in defining something by what it does rather than by what it is. Product claims may be drafted to include process steps to wholly or partially define the claimed product. To the extent that the process limitations distinguish the products over the prior art, they must be given the same consideration as traditional product characteristics.[3]

---

1 See Marks' Standard Handbook for Mechanical Engineers, page 13-15 (copy provided as Attachement B).

2 Hollister Inc. v. E.R. Squibb & Sons Inc. U.S. Court of Appeals Federal Circuit CA FC 14 USPQ2d 2069 4/30/1990 Decided April 30, 1990.

3 In re Hallman, 655 F.2d 212, 215 [210 USPQ 609, 611] (CCPA 1981).

Claim 1 on appeal describes a non-detachable press fit arrangement including a cold formed holding element and socket. None of the prior art to Grenier, Washburn or Crickmer disclose a non-detachable press fit arrangement or a cold formed holding element and socket, both as recited in appellant's claim 1. For at least these reasons none of Grenier, Washburn or Crickmer anticipate claim 1.[4] Accordingly, the rejections of claim 1 are improper and should be reversed.

Claim 9

Claim 9 further modifies claim 1 by providing that the socket of the fitting has an outer peripheral surface formed with an engagement member selected from the group consisting of circumferential groove, lobes, ribs and circumferential fins for attachment of a press tool. Appellant's specification at page 9, lines 12-18 describes the use of a press tool to cold form the socket. Cold forming requires high pressure. The application of high pressure is facilitated by use of a circumferential groove, lobes, ribs or circumferential fins which permits applying high pressure to cold form a particular location on a socket.

The final office action rejects claim 9 as anticipated by Grenier, Washburn or Crickmer and with respect to each it is argued that the relied on prior art "discloses the socket of the fitting having an outer peripheral surface formed with an engagement member selected from the group consisting of circumferential groove, lobes, ribs and circumferential fins for attachment of a press tool." This language in each of the rejections parrots the language from claim 9 on appeal, but there is no basis in any of Grenier, Washburn or Crickmer for this statement. The prior art does not disclose a press tool much less that the outer peripheral surface of the socket is formed with an engagement member selected from the group consisting of circumferential groove, lobes, ribs and circumferential fins for attachment of a press tool. For at least these reasons the rejections of claim 9 are improper and should be reversed.

4 To support a rejection of a claim under 35 U.S.C. 102(b), it must be shown that each element of the claim is found, either expressly described or under principles of inherency, in a single prior art reference. See Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983), cert. denied, 465 U.S. 1026 (1984).

Claim 25

Claim 25 further modifies claim 1 by providing that the socket is dimensioned to receive pipes having an insider diameter of greater than 54 millimeters. Pipes having an insider diameter of greater than 54 millimeters are useful for industrial and other heavy duty operations. Pipes of this size require a stronger non-detachable press fit arrangement.

The final office action rejects claim 25 over Grenier, Washburn or Crickmer and states

> [i]t would have been an obvious matter of design choice to dimension the socket to receive pipes having an insider (sic, inside) diameter of greater than 54 millimeters, since such modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955). (Office action at pages 11 and 12).

Grenier, Washburn or Crickmer do not disclose the size their pipes. However, one of ordinary skill in the art would have recognized that Grenier's, Washburn's or Crickmer's pipes are not of a diameter of greater than 54 millimeters because the disclosed coupling arrangements are not sufficiently strong for pipes larger than 54 millimeters. The press fit arrangement of appellant's claim 1 is a stronger arrangement than any of the relied on prior art arrangements. The fact that the prior art couplings are all detachable as opposed to appellant's non-detachable arrangement underscores the limited strength of the prior art versus that of appellant's claim 1. Claim 25 further highlights the difference between the prior art and the present claims wherein it becomes clear that the present claimed press fit arrangement is stronger. For at least these reasons the rejections of claim 25 are improper and should be reversed.

Conclusion of Argument

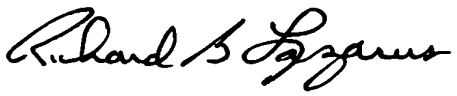
From the above, it is readily apparent that there is no anticipation of the present claims because the relied on prior art does not disclose all of the claimed limitations. The final office action just summarily rejects the claims without a proper explanation of where in the prior art there is a disclosure of the claimed limitations. The obviousness rejections similarly argue that limitations are obvious without explaining where in the prior art there is motivation for the obviousness conclusion.

For the foregoing reasons, the appellant, respectfully, requests that the rejections of claims 1, 2, 6, 9, 11 and 18-25 be reversed and the application be allowed.

It is respectfully requested that, if necessary to effect a timely response, this paper be considered as a Petition for an Extension of Time sufficient to effect a timely response and shortages in other fees, be charged, or any overpayment in fees be credited, to the Account of Barnes & Thornburg, Deposit Account No. 02-1010 (834/39803).

Respectfully submitted,

BARNES & THORNBURG



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Appendix A (Copy of Claims on Appeal)

1. In a non-detachable press fit arrangement between an end portion of a metal pipe and a crimpable socket of a fitting, with the socket defining an interior space and being formed with an annular anchoring groove facing the interior space for receiving a sealing ring, said press fit arrangement comprising at least one holding element resiliently secured to the socket in a receiving groove and cold formed together with the socket, said holding element has a material penetrating component formed by a plurality of cutting arcuate projections pointing in the direction of the anchoring groove and whose ends penetrate the metal pipe after the socket is crimped by cold forming, and wherein the annular anchoring groove is located in front of and separate from the receiving groove relative to the pipe end.

2. The press-fit arrangement of claim 1 wherein the socket is formed adjacent the anchoring groove for the sealing ring with an annular receiving groove facing the interior space for receiving the holding element, and wherein ~~the~~ said material penetrating component is a cutting edge arranged about the circumference of the holding element and extending to the end portion of the metal pipe.

6. The press-fit arrangement of claim 2 wherein the holding element is mounted by way of a positive fit into the receiving groove.

9. The press-fit arrangement of claim 1 wherein the socket of the fitting has an outer peripheral surface formed with an engagement member selected from the group consisting of circumferential groove, lobes, ribs and circumferential fins for attachment of a press tool.

11. The press-fit arrangement of claim 1 wherein the socket of the fitting is substantially round after being compressed, with sealing forces and holding forces applied between the socket and the end portion of the metal pipe being substantially evenly distributed about the circumference of the metal pipe.

18. The press-fit arrangement of claim 1 wherein the holding element has a hardness exceeding a hardness of the metal pipe.

19. The press-fit arrangement of claim 1 wherein the holding element is made of special steel.

20. The press-fit arrangement of claim 1 wherein the sealing ring is a seal selected from the group consisting of lip seal, O ring or matched formed part.

21. The press-fit arrangement of claim 1 wherein the sealing ring has a relatively small cross section.

22. The press fit arrangement of Claim 1, wherein the interior space of the socket includes a shoulder, which limits the amount of insertion of the pipe end, and the anchoring groove is between the shoulder and the receiving groove and spaced from the shoulder.

23. The press fit arrangement of claim 1, wherein the receiving groove includes two opposed walls, one of the walls limiting axial movement of the holding element away from the anchoring groove before insertion of the pipe end into the socket.

24. The press fit arrangement of claim 1, wherein the projections form one end of the holding element.

25. The press fit arrangement of claim 1, wherein the socket is dimensioned to receive pipes having an insider diameter of greater than 54 millimeters.

Appendix B (Copy of Marks' Standard Handbook for Mechanical Engineers, page 13-15.)

chemical combination is driven off. This is prior to decorative glazing. Fillers are used with clay binders for specialized purposes, such as iron powders for electronic items.

PLASTIC-WORKING TECHNIQUES

Reference should be made to a vast file of papers on plasticity, flow research, processes, techniques, and materials and to applicable bibliographies, especially as indexed in the Engineering Societies Library, 345 E. 47 St., New York 10017. The library provides a research service by mail at a moderate fee.

In the **metalworking** operations, as distinguished from metal cutting, material is forced to move into new shapes by plastic flow. **Hot-working** is carried on above the recovery temperature, and spontaneous recovery, or annealing, occurs about as fast as the properties of the material are altered by the deformation. This process is limited by the chilling of the material in the tools, scaling of the material, and the life of the tools at the required temperatures. **Cold-working** is carried on at room temperature and may be applied to most of the common metals. Since, in most cases, no recovery occurs at this temperature, the properties of the metal are altered in the direction of increasing strength and brittleness throughout the working process, and there is consequently a limit to which cold-working may be carried without danger of fracture.

A convenient way of representing the action of the common metals when cold-worked consists of plotting the actual stress in the material against the percentage reduction in thickness. Within the accuracy required for shop use, the relationship is linear, as in Fig. 4. The lower limit of stress shown is the yield point at the softest temper, or anneal, commercially available, and the upper limit is the limit of tensile action, or the stress at which fracture, rather than flow, occurs. This latter value does not correspond to the commercially quoted "tensile strength" of the metal, but rather to the "true tensile strength," which is the stress that exists at the reduced section of a tensile specimen at fracture and which is higher than the nominal value in inverse proportion to the reduction of area of the material.

As an example of the construction and use of the cold-working plots shown in Fig. 4, the action of a very-low-carbon

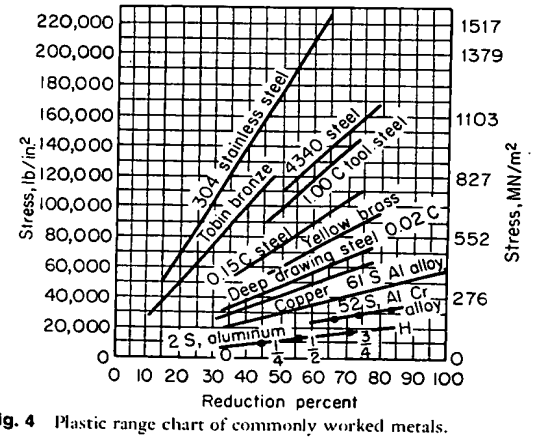

Fig. 4 Plastic range chart of commonly worked metals.

deep-drawing steel has been shown in Fig. 5. Starting with the annealed material with a yield point of 35,000 lb/in² (240 MN/m²), the steel was drawn to sucessive reductions of thickness up to about 58 percent, and the corresponding stresses plotted as the heavy straight line. The entire graph was then extrapolated to 100 percent reduction, giving the **modulus of strain hardening** as indicated, and to zero stress so that all materials might be plotted on the same graph. Lines of equal reduction

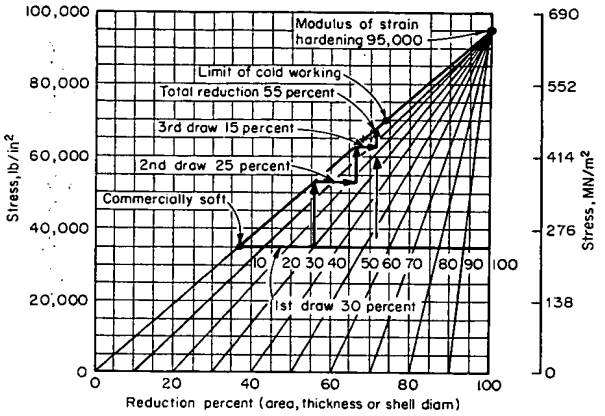

Fig. 5 Graphical solution of a metalworking problem.

are slanting lines through the point marking the modulus of strain hardening at theoretical 100 percent reduction. Starting at any initial condition of previous cold work on the heavy line, a percentage reduction from this condition will be indicated by a horizontal traverse to the slanting reduction line of corresponding magnitude and the resulting increase in stress by the vertical traverse from this point to the heavy line.

The traverse shown involved three draws from the annealed condition of 30, 25, and 15 percent each, and resulting stresses of 53,000, 63,000, and 68,000 lb/in² (365, 434, and 469 MN/m²). After the initial 30 percent reduction, the next 25 percent uses (1.00 − 0.30) × 0.25, or 17.5 percent more of the cold-working range; the next 15 percent reduction uses (1.00 − 0.30 − 0.175) × 0.15, or about 8 percent of the original range, totaling 30 + 17.5 + 8 = 55.5 percent. This may be compared with the test value percent reduction in area for the particular material. The same result might have been obtained, die operation permitting, by a single reduction of 55 percent, as shown. Any appreciable reduction beyond this point would come dangerously close to the limit of plastic flow, and consequently an annealing is called for before any further work is done on the piece.

Figure 6 shows the approximate **true-stress–true-strain** plotting of common plastic range values, for comparison with Fig. 4.

A practical manufacturing method of judging relative plasticity is to compute the ratio of initial yield point to the ultimate tensile strength as developed in the tensile test. Thus a General Motors research memo in 1955 listed steel with an 0.51 **yield-tensile ratio** [22,000 lb/in² (152 MN/m²) yp/43,000 lb/in² (296 MN/m²) U.T.S.] as being suitable for really severe draws of exposed parts. When the ratio reaches about 0.75, the steel should be used only for flat parts or possibly those

Marks'
Standard Handbook for Mechanical Engineers

Revised by a staff of specialists

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